UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/669,877	09/27/2000	Randell L. Mills	62-231-1EL	4531

20736 7590 09/29/2005

MANELLI DENISON & SELTER
2000 M STREET NW SUITE 700
WASHINGTON, DC 20036-3307

EXAMINER	
TSANG FOSTER, SUSY N	
ART UNIT	**PAPER NUMBER**
1745	

DATE MAILED: 09/29/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/669,877	MILLS, RANDELL L.	
	Examiner	Art Unit	
	Susy N. Tsang-Foster	1745	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *23 May 2005*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-28* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-28* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date *20050523*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☒ Other: *See Continuation Sheet*.

Continuation of Attachment(s) 6). Other: Appendix A, Consolidated Appendix.

DETAILED ACTION

Continued Examination Under 37 CFR 1.114

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submissions filed on 5/23/2005 have been entered.

Response to Applicant's Submissions

2. This Office Action is responsive to the response filed on 5/23/2005, and the appendix filed on 5/23/2005. Claims 1-28 are pending. No amendments have been made to the claims since the last office action. Claims 1-28 are finally rejected for the reasons of record.

Information Disclosure Statement

3. The information disclosure statements filed on 5/23/2005 been considered by the Examiner.

Claim Rejections - 35 USC § 101

4. 35 U.S.C. 101 reads as follows:

> Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title.

5. Claims 1-28 are rejected under 35 U.S.C. 101 because the disclosed invention is inoperative and therefore lacks utility.

See the reasons given under this heading in the previous Office Action mailed on 9/9/2002.

Claim Rejections - 35 USC § 112

6. The following is a quotation of the first paragraph of 35 U.S.C. 112:

> The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

7. Claims 1-28 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the enablement requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to enable one skilled in the art to which it pertains, or with which it is most nearly connected, to make and/or use the invention.

See the reasons given under this heading in the previous Office Action mailed on 9/9/2002.

Response to Arguments

8. Applicant's arguments filed 5/23/2005 have been fully considered but they are not persuasive.

Applicant's arguments filed on 5.23.2005 are unpersuasive.

The attached appendix A addresses the specific arguments in applicant's present appendix (Response to Souw Appendix attached to May 12, 2005 Advisory Action) filed on 5/23/2005.

The attached consolidated appendix of examiner's response of record to applicant's arguments of record clearly provides substantial evidence that applicant's hydrino or one electron hydrino-like atoms with an atomic mass of at least four cannot theoretically exist and that most of applicant's experimental evidence of record have not been reproduced or cannot be reproduced by independent third parties. In the few instances where applicant's experiments are replicated by independent third parties (NASA (see below), Cvetanovic et al. (see below) and Jovicevic et al. (see below)), the results can be explained by conventional scientific theories.

It is noted that a major portion of applicant's present response are repeats of his arguments of record which have been previously addressed by the Examiner in the Office actions of record and appendices attached therein. For applicant's convenience, the consolidated appendix incorporates some of the main points from all the appendices attached to previous office actions of record and from the Examiner's present arguments and previous arguments of record. All arguments from previous Office actions of record and attached appendices therein are herein incorporated by reference in their entirety.

The invention of the present application is drawn to catalytic reactions of one electron atoms each having an atomic mass of at least four to form compositions of matter comprising new forms of one electron atoms having an atomic mass of at least four and having an increased binding energy greater than the binding energy of the corresponding ordinary atomic ion. Specifically, new forms of one electron atoms such

as He^{+}, Li^{2+} and Be^{+3} are each disclosed and claimed to have a binding energy greater than the binding energy of ordinary He^{+}, ordinary Li^{+2} and ordinary Be^{+3}, respectively.

The only theoretical support for applicant's present invention appears to be related to applicant's theory of the hydrino atom having a binding energy given by $13.6eV/(1/p)^2$ where p is an integer value greater than 1 (see equation on page 1 of applicant's specification). Applicant postulates that the catalytic reaction of either the conventional ground state hydrogen atom to unconventional lower energy states or the hydrino atom to unconventional lower energy states by reacting an ordinary ground state hydrogen atom or a hydrino atom with a catalyst having a net enthalpy of reaction of about m x 27.2 eV where m is an integer may be generalized to all one electron atoms (see page 4 of applicant's specification).

Applicant defines a one electron atom to be an atom comprising a nucleus and one electron (see page 4 of the specification). Applicant extends his theoretical postulates of the hydrino atom which contains one electron and a nucleus having one proton to all one electron atoms (see pages 4 and 6 of applicant's specification). Applicant merely states in the present specification but does not prove the applicability of theory of the hydrino atom to all one electron atoms. Applicant appears to assume that his theory of the hydrino atom which is postulated and not derived (see reasons below), applies to all one electron atoms by modifying the postulated equation of the energy levels of a hydrino atom which is $13.6\ eV/\ (1p)^2$ (see page 1 of the specification) by simply multiplying it with a factor of q^2 where q is the nuclear charge of one electron atom to give the

equation $q^2 13.6\ eV/(1/p)^2$ where p is an integer greater than 1 to represent the energy levels of a one electron atom having increased binding energy as compared to the corresponding ordinary one electron atom (see page 10 of applicant's specification).

It does not appear that any of the equations of applicant's theory as shown in applicant's book, the Grand Unified Theory of Classical Quantum Mechanics, either the 1999 edition or the 2000 edition, take into account the nuclear charge q so it is therefore unclear how a solution of the energy levels of a one electron atom involving nuclear charge q would come about from applicant's theory if the nuclear charge q of the atom does not appear in any of the equations. In addition to the increased binding energy of the one electron atom, applicant asserts that energy is a further product of the catalysis reaction as a result of the lower energy state transitions of the one electron atoms (see page 12 of the specification).

According to applicant's theory of the hydrino atom, a hydrino atom is formed by reacting an ordinary ground state hydrogen atom with a catalyst having a net enthalpy of reaction of about m x 27.2 eV where m is an integer (see page 2 of applicant's specification). Applicant states that an ordinary hydrogen atom (n=1) releases a net enthalpy of 40.8 eV when it is catalyzed to the n=1/2 state (see page 4 of applicant's specification) and that the energy given off during catalysis is much greater than the energy lost to the catalyst and that the energy released is large as compared to conventional chemical reactions (see page 3 of applicant's specification).

The catalyst according to applicant's postulate is an energy hole or source of energy hole that releases energy from the hydrogen atom with a commensurate decrease in size of the hydrogen atom to form a novel state of the hydrogen atom having a fractional quantum energy level such that ordinary hydrogen having quantum number n=1 undergoes catalytic transitions to n =1/2 (see page 3 of applicant's specification). Applicant also states that further catalytic transitions may occur from n=1/2 → 1/3, 1/3 →1/4, 1/4→1/5 and so on and that once catalysis begins, hydrinos autocatalyze further in a process called disproportionation (See page 4 of applicant's specification).

It appears that applicant extends his model of the hydrino atom by assuming without an explanation that all one electron atoms will undergo lower energy state transitions in the presence of a catalyst that provides a net enthalpy of reaction of about m x 27.2 eV where m is an integer. Applicant asserts on page 5 of the specification that a hydrino atom may provide a net enthalpy of reaction of about m x 27.2 eV where m is an integer in an ionization reaction to served as a catalyst for He^+ (which is a one electron atom) or lower-energy He^+ to undergo a transition to a lower energy state (see page 5 of applicant's specification).

There is no plausible physical mechanism of energy transfer to explain why a catalyst having an net enthalpy of reaction of m x 27.2 eV would cause a lower energy state transition of a one electron atom such as hydrogen from the ordinary ground state n =1 to a lower nonexistent energy state n = ½ . Moreover, the net enthalpy of reaction of m x 27.2 eV does not match the energy given off by the first lower energy state transition

of n = 1 to n =1/2 which is 40.8 eV as admitted by applicant on page 4 of applicant's specification.

On page 13 of the specification, applicant proposes a mechanism of catalyzing ordinary He^+ atom with Fe to give an overall reaction of

$$He^+[a_H/2] \rightarrow He^+ [a_H/3] + [3^2-2^2] \text{ x}13.6 \text{ eV}$$

This mechanism does not appear to make any sense since it does not show how $He^+ [a_H/2]$ corresponding to p=2 state for He^+ is initially obtained since the reaction starts out with ordinary He^+ (p=1) and Fe. It would appear from the analogous reaction equation for the hydrino atom on page 3 of applicant's specification that the equation on page 13 of the specification corresponds to a transition of p =2 of He^+ to p =3 of He^+. In addition, the enthalpy part of the equation on page 13 is off by a factor of 4 since the nuclear charge for helium is q=2 and must be accounted for in the binding energy of a one electron helium ion according to applicant's theory as seen in equation 11 on page 10 of applicant's specification. The energy difference between the $He^+ [a_H/3]$ state and the $He^+[a_H/2]$ state is 272 eV according to equation 11 on page 10 of applicant's specification and the triple ionization reaction of Fe to Fe^{3+} having a net enthalpy of reaction of 54.7 eV would not be able to catalyze the reaction as asserted by applicant on page 13 of the specification. Therefore, applicant's mechanism on page 13 for catalyzing He^+ using Fe to a lower energy state is not plausible and does not make any physical or mathematical sense. Moreover, applicant has not shown how this incorrect mechanism would even be

applicable to all one-electron atoms since the nuclear charge q would be different for different atoms and would affect applicant's proposed catalytic net enthalpy requirements of reaction according to equation 11 on page 10 of applicant's specification.

Notwithstanding the implausibility of the mechanism of catalysis proposed by applicant as discussed above, energy states lower than n =1 for a one electron atom, whether they are those of a hydrino atom, or those of a one electron atom having an atomic mass of at least four, are not conventionally known or accepted by one of ordinary skill in the art.

Since applicant's present invention for one electron atoms having increased binding energy is based on an unexplained extension of applicant's erroneous theory of the hydrino atom by simply multiplying the energy levels of a hydrino atom by q^2 where q is the nuclear charge of the one electron atom, applicant's presently claimed invention of compounds and method of making these compounds comprising one electron atoms having an increased binding energy greater than the binding energy of the corresponding ordinary atomic ion are not theoretically supported since the theory of the hydrino atom is mathematically and scientifically flawed for reasons given below.

Furthermore, applicant has not provided independent experimental evidence for these new forms of one electron atoms having an atomic mass of at least four and having an increased binding energy greater than the binding energy of the corresponding ordinary one electron atomic ion. All experimental submissions to date are drawn to

applicant's attempt to prove the existence of the hydrino atom based on experiments containing a hydrogen atom and therefore do not provide experimental evidence for new forms of one electron atoms having an atomic mass of at least four and having an increased binding energy greater than the binding energy of the corresponding ordinary one electron atomic ion. Nevertheless, applicant's experimental submissions to prove the existence of the hydrino atom are not persuasive for reasons given below.

Applicant's present invention is based on a flawed premise for the energy levels of a shrunken hydrogen atom called a hydrino or a shrunken hydrogen-like atom called hydrino-like atom or one-electron atom having an atomic mass of at least four with increased binding energy compared to the corresponding atomic ion which has energy levels below the conventional ground state energy level of the hydrogen atom or the ground state energy level of the one-electron hydrogen-like atom. Since the same theory is used to derived the fractional energy levels for the hydrino atom and the hydrino-like atom, the discussion below will focus on the hydrino atom.

The energy levels of the hydrino atom allegedly determined by applicant's flawed theory called classical quantum mechanics (CQM) have fractional quantum numbers n = 1/2, 1/3, 1/3, etc. In contrast, the conventional energy levels of the hydrogen atom determined by quantum mechanics (referred to by applicant as standard quantum mechanics, SQM, or QM) have integer quantum numbers n = 1, 2, 3, etc. which can be readily verified by any standard undergraduate physical chemistry textbook.

The examiner's present response to applicant's main arguments is organized into the following topics below.

I. ***Basic premise of applicant's theory of hydrino or one-electron hydrino-like atom is mathematically and scientifically flawed such that the hydrino or one-electron hydrino-like atom does not theoretically exist***

For reasons already discussed in detail in the appendices attached to the Office actions of record (the main points of which are contained in the attached consolidated appendix), the basic premise of applicant's theory of the hydrogen atom to give the energy states for the hydrino atom is fundamentally flawed in that not only is the starting wave equation for the physical model of the electron density in a hydrogen atom incorrect, the *ad hoc* Dirac δ (delta) function proposed as the solution does not mathematically satisfy the starting wave equation to yield fractional quantum energy states for the hydrogen atom as alleged by applicant (see Section of 10 attached consolidated appendix).

If the proposed Dirac δ (delta) solution is not a mathematical solution to applicant's basic wave equation for his theory, applicant's *ad hoc* result of fractional quantum energy states of the hydrogen atom are not derived, just stated and have no mathematical or scientific foundation.

According to MPEP § 2107.02, an asserted utility is credible unless the logic underlying the assertion is seriously flawed. As discussed above and in Section 3-10 of the attached consolidate appendix, applicant's end result of energy levels for the hydrogen atom having fractional quantum numbers does not logically follow from his

alleged Dirac δ (delta) function solution that does not solve his original starting wave equation for the electron density in a hydrogen atom that represents the basic premise of his theory that underlies his invention. Applicant does not prove that the Dirac δ (delta) function is the solution to starting wave equation which results in the fractional quantum energy levels for the hydrogen atom. Applicant merely states what he deems to be the solution without giving any mathematical proof. Applicant has not been successful in refuting this breakdown of logic in the mathematics of his theory.

Because the Dirac δ (delta) function is not the mathematical solution to applicant's basic equation representing the electron density in a hydrogen atom, the fractional energy states represented by E_n where n = 1/2, 1/3, 1/4 etc., do not logically follow from the *ad hoc* Dirac δ (delta) function. Applicant has provided no explanation in his book, R. Mills, "The Grand Unified Theory of Classical Quantum Mechanics," Cranbury, New Jersey: BlackLight Power Inc., (1999 or 2000 edition) or in the present specification how the solution to the energy levels of hydrino given by E_n where n = 1/2, 1/3, 1/4, etc., results from using the Dirac δ (delta) function in his starting equation. The examiner's analysis and conclusion that the theory of the hydrino atom is mathematically and scientifically flawed have been repeated throughout prosecution history. Most recently, Andreas Rathke of the European Space Agency (ESA) has published an article entitled "A critical analysis of the hydrino model" in the New Journal of Physics (vol. 7 (2005) 127) and the article reaches the same conclusion as set forth by the examiner that the applicant's CQM is mathematically and scientifically flawed and does not predict the existence of hydrino states. Rathke also states in the conclusion of the paper that standard quantum mechanics cannot encompass hydrino states.

Because the hydrino atom does not theoretically exist, there is no scientific basis for evaluating applicant's experimental data which uses the flawed mathematical solution to analyze his own data. It is illogical to use a flawed solution to evaluate applicant's data to prove the correctness of a flawed solution. Applicant's experimental data has no theoretical foundation. In other words, it is logically impossible for applicant's experimental data to confirm a hypothesized solution (that is, the fractional quantum number energies stated by applicant, not derived from first principles) which does not logically follow from a starting premise given by his basic equation that is scientifically flawed for reasons given in Sections 3-10 of the consolidated appendix.

An *ad hoc* solution that does not mathematically satisfy applicant's basic equation of his theory cannot logically yield any useful results nor would it be logically possible to confirm a flawed theory through an *ad hoc* result (fractional quantum number energy states for the hydrino atom) by any experimental data.

Applicant's response that the Dirac δ (delta) function solution does not have to solve the generic equation does not make any mathematical sense (see for example, page p. 45 of appendix filed on 5/23/2005 in U.S. Serial No. 09/669,877).

Applicant's response violates one of the fundamental principles of mathematics that a solution of a equation must satisfy the starting equation in order for it to be called and be qualified as a solution of the equation.

II. Unlike quantum mechanics, applicant's flawed theory of the hydrino atom is not accepted by the scientific community

Contrary to applicant's assertions in his response (see for example, page 126 in the response filed on 5/23/2005 in U.S. Serial No. 09/669,877), applicant's theory has not been accepted by the scientific community. At least as early as 1989, applicant's theory has been self published and made readily available to the scientific community through book vendors such as Amazon.com. To date, not one prestigious university in the United States teaches applicant's theory of the hydrino in their basic undergraduate science curriculum. Mainstream physicists do not agree with applicant's theory (see for example, article by E. Baard, "Quantum Leap," The Village Voice, December 22-28, 1999; Cvetanovic et al., "Excessive Balmer line broadening in a plane cathode abnormal glow discharge in hydrogen," Journal of Applied Physics 97, 033302 (2005), pp. 033302-1 to 033302-8 (hereinafter referred to as Cvetanovic et al., J. Appl. Phys. (2005)); Jovicevic et al. "Excessive Balmer line broadening in microwave-induced discharges," Journal of Applied Physics 95, 24 (2004) (herein after referred to as Jovicevic et al., J. Appl. Phys. (2004); and A. Rathke, "A critical analysis of the hydrino model," New Journal of Physics **7** (2005) 127).

Requiring acceptance of applicant's theory (which is the foundation of his invention) by the scientific community is not improper for patentability as alleged by applicant in his response (see page 126 in the response filed on 5/23/2005 in U.S. Serial No. 09/669,877). If a theory is inconsistent with known scientific principles or that it is incredible in view of contemporary knowledge, utility rejection of the claims which is based on the theory would be appropriate according to MPEP § 2107.01 and § 2107.02.

MPEP § 2107.01 states:

> Other cases suggest that on initial evaluation, the Office considered the asserted utility to be inconsistent with known scientific principles or "speculative at best" as to whether attributes of the invention necessary to impart the asserted utility were actually present in the invention. *In re Sichert*, 566 F.2d 1154, 196 USPQ 209 (CCPA 1977). However cast, the underlying finding by the court in these cases was that, based on the factual record of the case, it was clear that the invention could not and did not work as the inventor claimed it did.

MPEP § 2107.02 also states:

> One situation where an assertion of utility would not be considered credible is where a person of ordinary skill would consider the assertion to be "incredible in view of contemporary knowledge" and where nothing offered by the applicant would counter what contemporary knowledge might otherwise suggest.

The Examiner considers applicant's asserted utility of the hydrino atom not to be credible where a person of ordinary skill in the art would consider the assertion to be "incredible in view of contemporary knowledge" of the electronic structure of the hydrogen atom. The contemporary knowledge of the energy levels of the hydrogen atom is that given by quantum mechanics which has been accepted by the scientific community.

The Examiner's analysis did not start with a presumption of "incredible utility" under 35 U.S.C. 101 as alleged by applicant (see page 2 of applicant's present response

filed on 5/23/2005 in U.S. Serial No. 09/669,877) but instead the Examiner has provided substantial evidentiary basis for that assertion of "incredible utility" in previous appendices which have been incorporated into the attached consolidated appendix. The consolidated appendix provides a lengthy and detailed explanation of why applicant's theory is mathematically and scientifically flawed (see Sections 3-10 in attached consolidated appendix).

Applicant's hydrino or one electron hydrino-like atoms having an atomic mass of at least four are wholly inconsistent with contemporary knowledge in the art of atomic physics governed by quantum mechanics. Applicant's theory of the hydrogen atom is contrary to quantum mechanics which has been accepted by the scientific community. Applicant is advocating a new form of the hydrogen atom or a new form of one electron atoms called the hydrino or hydrino-like atoms respectively which have no valid scientific basis.

If applicant's novel theory of the hydrogen atom has been accepted by the scientific community as alleged by applicant, then quantum mechanics would not have been offered as an entire course in any reputable university since quantum mechanics directly contradicts applicant's theory of the hydrogen atom. Acceptance of applicant's theory would overturn 100 years of quantum mechanics (see Section 2 of the attached consolidated appendix). Nevertheless, since applicant's theory is mathematically and scientifically flawed, it is incapable of disproving quantum mechanics contrary to applicant's assertions of record.

As evidence of acceptance of quantum mechanics by the scientific community, quantum mechanics is still taught in prestigious universities today. McQuarrie (D. McQuarrie. Quantum Chemistry. Sausalito, California: University Science Books, 1983), a reference cited and used by applicant to support his arguments of record, and Karplus and Porter (M. Karplus and R. Porter. Atoms and Molecules: An Introduction for Students of Physical Chemistry. Reading, Massachusetts: W.A. Benjamin, Inc., 1970) are two exemplary standard physical chemistry textbooks still in use in many undergraduate science curriculums in the United States. The textbooks do not recognize fractional quantum number energy states for the hydrogen atom or for the one electron hydrogen like atoms and instead recognize only integer quantum number energy states for the hydrogen atom and for the one-electron hydrogen like atoms where principal quantum number n is 1, 2, 3, etc. (see pages 118-122 of Karplus and Porter and page 221-222 of McQuarrie).

In fact, Karplus and Porter also states on page 3 that:

> "Newton's laws do not apply to electrons in atoms and a set of laws, comprising what is known as quantum mechanics, has to be obtained for a correct description of electronic behavior."

The Examiner also checked the Massachusetts Institute of Technology's (MIT's) Opencourseware Website which confirms that the theory of the hydrogen atom based on quantum mechanics has not been changed for the graduate curriculum and applicant's theory is not taught in MIT's online course material. MIT's OpenCourseware website

under the chemistry link lists the following course material, Introductory Quantum mechanics II, Spring 2005, as being available online (see attached Chemistry Course Listings in MIT OpenCourseWare. [online]. Massachusetts Institute of Technology, 2005. [retrieved on 2005-09-16]. Retrieved from the Internet: <URL: http://ocw.mit.edu/OcwWeb/Chemistry/index.htm>).

MIT OpenCourseWare is a free, open publication of MIT Course Materials and the website allows the public to view and download all the course material online (see Welcome to MIT's OpenCourseWare Home Page. [online]. Massachusetts Institute of Technology, 2005 [retrieved on 2005-09-16]. Retrieved from the Internet: <URL: http://ocw.mit.edu/index.html >).

As seen in the chemistry section of the website, courses material in quantum mechanics are openly available to the public at this time. The course listing online provides evidence that a prestigious institution like MIT has not rejected quantum mechanics otherwise it would not offer online course material on quantum mechanics to the public as of September 2005 and would not have devoted an entire graduate level course in quantum mechanics in Spring 2005.

As further evidence of the acceptance of quantum mechanics to determine the energy levels of the hydrogen atom, the National Institute of Standards and Technology's (NIST's) website provides access to a database which calculates theoretical values of energy levels of hydrogen for principal quantum number n =1 to 200. To date, this database does not recognize fractional quantum integers n for the energy levels of hydrogen atom (see NIST's Physical Reference Datasheet, "Energy Levels of Hydrogen

and Deuterium" [online]. [retrieved on 2005-09-12]. Retrieved from the Internet: <URL: http://physics.nist.gov/PhysRefData/HDEL/index.html>.

Most important, NIST's database recognizes the ground state of the hydrogen atom to be at $n=1$.

Contrary to applicant's assertion that quantum mechanics is nonsense and has not produced anything useful (see for example, pp.133-141 of applicant's response filed on 5/23/2005 in U.S. Serial No. 09/669,877), many technological advances enjoyed by society today are direct applications of quantum mechanics (see Section 3 of consolidated appendix).

Applicant asserts that his theory of the hydrino atom is accepted by the scientific community because he has many publications in major scientific journals. Although applicant has published in various journals, most of the journals in which applicant has published are not mainstream journals in the field of atomic physics to which the instant application pertains. It is noted that applicant's only publication in the Journal of Applied Physics (Mills et al., J. Appl. Phys. 92, 7008 (2002)), which is relevant to the field of atomic physics, makes no reference to the hydrino theory but it only presents applicant's plasma results. The publication of applicant's article in the Journal of Applied Physics merely gives the scientific community access to applicant's experimental results for scientific debate and scrutiny. It is noted that a plasma group (Cvetanovic et al., "Excessive Balmer line broadening in a plane cathode abnormal glow discharge in hydrogen," Journal of Applied Physics 97, 033302 (2005), pp. 033302-1 to 033302-8, hereinafter referred to as Cvetanovic et al., J. Appl. Phys. (2005)) also

published an article in the Journal of Applied Physics which expressed disagreement with applicant's interpretation of his own plasma results published in the Journal of Applied Physics in 2002.

It is noted that applicant's consistent pattern of misrespresenting scientific articles and textbooks throughout prosecution history is further evidenced by his latest mischaracterization of the experimental results of the plasma group published in the Journal of Applied Physics in 2005 (Cvetanovic et al., J. Appl. Phys. (2005)) which criticized applicant's RTM explanation of his plasma data published in the Journal of Applied Physics in 2002 (Mills et al., J. Appl. Phys. 92, 7008 (2002)). Applicant states on page 169-170 in his response filed on 5/23/2005 in U.S. Serial No. 09/669,877 that he "agrees with the data reported in the Cvetanovic paper that the line energy of the hot H is independent of the direction relative to the electric field, it is symmetrical at all angles and independent of pressure and exists in region of low or no field" and that the results "confirm the catalysis, not field acceleration as the source of the broadened H lines." The paper by Cvetanovic et al. never mentions the term "field acceleration" and the paper clearly did not agree with applicant's proposed catalysis mechanism as the source of line broadening in the plasma experiments.

Applicant's attempts to discredit the Cvetanovic paper by asserting the following (see page 168 in response filed on 5/23/2005 in U.S. Serial No. 09/669,877):

> " ...the text of the article contains some clear misrepresentations. Specifically, the data regarding the fit of Figure 4c (but notably not that of Figures 4a and 4b) is missing. It also appears to the careful reader that Fig. 4c was printed in a larger format than Figures 4a and 4b, and hence gives the appearance to the casual reader that the broadening in Figure 4c is larger than that of figures 4a and 4b. In fact, the broadening in Figure 4c is virtually identical to that measured for Figures 4a and 4b."

Applicant's statements above have no merit and also contain some inconsistencies. It is unclear how applicant would know that the broadening in Figure 4c is virtually identical to that calculated for Figures 4a and 4b if the paper as alleged by applicant did not provide the data regarding the fit of Figure 4c. As one of ordinary skill would know, the line broadening cannot be visualized or observed as implied by applicant about the larger size format of Figure 4(c). The line broadening in a spectral line must be mathematically determined by using a Voigt profile which is a convolution of many contributions to the line widths. A fit of the spectral line to the Voigt profile enables one of ordinary skill in the art to determine the source of line broadening. Figure 4(c) clearly indicates that Cvetanovic et al. has done the appropriate analysis of his data. It is applicant who mischaracterizes the results of the Cvetanovic et al. paper in response to the paper's refutation of applicant's RTM model as a source of H α line broadening in applicant's plasma data reported in applicant's 2002 Journal of Applied Physics paper.

Furthermore, applicant attempts to explain the emission spectrum of the extreme ultraviolet background of interstellar matter given in the Labov and Bowyer paper (see for example, pp. 153- 157 of response filed on 5/23/2005 in U.S. Serial No. 09/669,877). As mentioned in the previous office actions, the astrophysics community rejects applicant's hydrino explanation of the data presented in the Labov and Bowyer paper of record (see Section 24 of consolidated appendix).

III. Most of Applicant's voluminous amount of experimental data have not been independently verified by third parties and attempts to reproduce some of applicant's experimental results have been unsuccessful or inconclusive and in the few instances

where some of Applicant's experimental data have been reproduced show these specific data can be explained by conventional scientific theories

Applicant asserts the following (see page 4 of response filed on 5/23/2005 in U.S. Serial No. 09/669,877):

"The Committee does not even mention, let alone consider, most of the certified experimental evidenced identified in Applicant's Rule 132 Declarations that were submitted to overcome the rejections of record. "

In response, most, if not all, of applicant's experimental data have been certified by applicant himself or coworkers and not by independent third parties. Applicant alleges 51 independent third parties testing in his response (see pages 60-98 in response filed on 5/23/2005 in U.S. Serial No. 09/669,877). An analysis of the list of 51 studies shows that applicant is an author of at least 31 of those studies (see items # 51-49, 47, 46, 43-20, 16, and 7 in which applicant is lead author or coworker). The studies listed in items 13-15, and 48 are conducted by Phillips who is a coworker as evidenced by items #50 and 51 in which applicant and Phillips are coauthors of those studies. The study listed in item 8 is conducted by Shaubach who is also a coworker (as evidenced by item #7 in which Shaubach and applicant are coauthors of that study). Thus, at least 36 of the 51 studies are not independent test studies. In the few instances where attempts made by independent third parties to reproduce applicant's data have been unsuccessful. For example, studies conducted by EarthTech, Westinghouse, Brookhaven, and NASA were

addressed by the examiner in the previous office actions (see Sections 21 of the consolidated appendix).

Some of Applicant's experimental data as discussed in the previous office actions and attached appendices can be explained by conventional science without using applicant's flawed theory of the hydrino atom. As discussed above, plasma physicists (Cvetanovic et al., J. Appl. Phys. (2005) and Jovicevic et al., J. Appl. Phys. (2004)) provided alternative explanations for the line broadening in the Balmer H alpha line in applicant's plasma data (Mills et al., J. Appl. Phys. 92, 7008 (2002)).

Applicant's interpretation of his plasma data is inconsistent with his own theory. According to applicant's theory of hydrino formation using a hydrogen catalyst acting as an energy hole (see applicant's book, R. Mills, The Grand Unified Theory of Classical Quantum Mechanics, Blacklight Power, Inc., Cranbury, 2000, pp. 147-152), an atom can serve as a hydrogen catalyst if the atom is capable of providing a net enthalpy of reaction of approximately m x 27.2 eV. It is noted that on pages 150-151 of applicant's book (GUT, 2000 edition), multiple atoms can be involved in the catalytic reaction to form a hydrino atom. *Id.* Since the first ionization potential of an H atom is 13.6 eV, two H atoms would clearly give the required enthalpy of m x 27.2 eV where m =1 in this instance to catalyze the formation of a hydrino atom from an H atom in the plasma.

Therefore, according to applicant's theory there should be excessive line broadening in the α Balmer line in applicant's plasma data in experiments involving pure hydrogen alone in the plasma. Instead, there is an absence of excessive line broadening in the α Balmer line in plasmas containing only hydrogen gas (see for example Figure 8 in Mills et al., "Comparison of Excessive Balmer α Line Broadening of Inductively and

Capacitively Coupled RF, Microwave, and Glow-Discharge Hydrogen Plasmas with Certain Catalysts," IEEE Transactions on Plasma Science, Vol. 31, No. 3, (2003), pp. 338-335).

The Examiner's point is further supported by the following statements in the same paper by applicant (p. 346, Mills et al., IEEE Transactions on Plasma Science, Vol. 31, No. 3, (2003), pp. 338-335):

> "In our microwave hydrogen plasma, no such strong filed exits. However, the conditions for RT plasmas are met. Since the ionization energy of hydrogen is 13.6 eV, two hydrogen atoms can provide a net enthalpy equal to the potential energy of the hydrogen atom, 27.2 eV - the necessary resonance energy for a third hydrogen atom."

The Cvetanovic et al. studies of the excessive broadening of the hydrogen Balmer alpha line in abnormal glow discharge experiments (Cvetanovic et al., J. Appl. Phys. (2005)) contradict applicant's resonance transfer model to explain the excessive line broadening in glow discharge plasmas (Mills et al., IEEE Transactions on Plasma Science, Vol. 31, No. 3 (2003), pp. 338-335). Cvetanovic et al. states that "[f]or the analysis of line shapes and for the study of the Hx axial intensity decays, the collision model is adequate...The presence of large excessive Hα line broadening in pure hydrogen and several experimental results, such as the importance of the direction of observation with respect to the electric field and exponential decay of excessive broadened Balmer line intensity in the negative glow, are in contradiction to the resonance transfer model" Cvetanovic et al. at p. 0300032-7.

Despite applicant's assertions that the collisional model would not explain the Balmer H alpha line broadenings in the microwave-induced discharge (MID) experiments since there is no electric field used in MID experiments, this point is irrelevant because glow discharge and microwave induced discharge experiments are entirely two different plasma systems with different ion dynamics and cannot be directly compared. Nevertheless, Cvetanovic et al. notes at page 033302-2 that "in two other experiments performed simultaneously in two different laboratories, no excessive broadening is detected in MIDs" followed by footnote 14 to Jovicevic et al. "Excessive Balmer line broadening in microwave-induced discharges," Journal of Applied Physics 95, 24 (2004).

The abstract of the Jovicevic et al. paper states "[r]esults of a hydrogen Balmer line-shape study on microwave-induced plasma discharges operated with pure hydrogen and with argon-hydrogen or helium-hydrogen mixtures are reported. Plasma is generated in a rectangular or coaxial microwave cavity in two separate experiments. In both cases, the emission profiles of the Balmer lines did not show excessive broadening as reported by Mills et al. [J. Appl. Phys. 92, 7008 (2002)]." Identical to applicant's microwave induced discharge experiments, **Jovicevic et al. also use an Evenson cavity**. Jovicevic et al. at p. 25. Jovicevic et al. also point out on page 25 of the paper that earlier studies of excessive Balmer line broadening in Ne/H_2, Kr/H_2, and Xe/H_2 mixtures contradict the data presented in applicant's paper (Mills et al., J. Appl. Phys. 92, 7008 (2002)). **As stated in the Jovicevic et al. paper, the experimental conditions were kept as close as possible to the conditions in applicant's experiments reported in the Journal of Applied Physics 2002 paper cited above.**

Therefore, in light of alternative explanations or lack of reproducibility of applicant's plasma experiments, applicant's assertion regarding his line broadening of the Balmer hydrogen alpha line in his plasma experiments as evidence of hydrino is unpersuasive.

The Examiner recommends Doppler-free laser spectroscopy as it would ultimately clarify the longstanding puzzle regarding the origin of excessive broadening in hydrogen lines. It is unscientific to make an unsupported statement that the Doppler-free laser spectroscopic line width would be negligible in comparison to the observed broadening, since such measurement has never been actually made in the entire history of hydrogen line broadening anomaly. If and only if it turns out that the Doppler-free (i.e., homogenous) line width is within the conventionally known natural line width can one conclusively conclude that the observed broadening is inhomogeneous (Doppler). However, it may well turn out that the Doppler-free line width is effectively as broad as the observed line width, e.g., in the form of plasma satellites or microwave satellites (Blochinzew effect).

Despite the fact that applicant has failed to sufficiently address the mathematical and scientific flaws in the basic premise of his invention, applicant's evidence submitted of record have been considered by the Examiner to the extent they are relevant to the scope of applicant's invention based on the hydrino or hydrino-like atom (see Sections 19-25 of attached consolidated appendix). The voluminous amount of applicant's own experimental data does not address this failure and detracts from the central issue of the

flawed premise for his invention. Nevertheless, the applicant's experimental data do not provide support for the existence for the hydrino for reasons set forth above and in the consolidated appendix.

Thus, in view of the serious mathematical and scientific flaws in applicant's theoretical foundation for his invention that is contrary to known science, the lack of independent, reproducible experiments that verify the existence of the hydrino atom, and the lack of experimental evidence for one electron atoms having an atomic mass of at least four characterized by an increased binding energy greater than the binding energy of the corresponding ordinary atomic ion as presently claimed, applicant has failed to provide preponderance of evidence to support his claims.

Conclusion

9. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

10. Any inquiry concerning this communication or earlier communications should be directed to examiner Susy Tsang-Foster, Ph.D. whose telephone number is (571) 272-1293. The examiner can normally be reached on Monday through Friday from 9:30 AM to 6:00 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Patrick Ryan can be reached at (571) 272-1292.

The fax phone number for the organization where this application or proceeding is assigned is (571) 273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

st/

Susy Tsang-Foster

Susy Tsang-Foster
Primary Examiner